

LA-5

Refuge Manager, Lake Andes Refuge,
Lake Andes, South Dakota

February 24, 1966

Acting Assistant Regional Supervisor, Division
of Wildlife Refuges, Minneapolis, Minnesota

In reply refer to: R

1966 Annual Water Program - Lake Andes Refuge

Your 1966 Annual Water Program is approved.

Please see the attached copy of the Regional Engineer's comments
on this subject.

You will recall several points that were brought out during the recent conference which should be given consideration in preparing your Annual Program in order to document use. Mr. Doeling made reference to the need for both consumptive and general water use. The computing refuge inflow-outflow sheets that were given out during the conference will serve you as a good guide for future reports if you are not using this method at present. A critical review of your water record files should be made to see that proper records are being maintained and that they include the needed information for documentation. If not, you should gear future recordings with this objective in mind. By updating your files and drawing all the material together it would assist you and future managers with questions that repeat themselves over the years. This can include water rights, flowage easements, water allotments, cattle watering easements, gauge records, and others.

D. Wilson
2/24/66

For the current year you should plan to operate at the 1435 elevation to the extent possible, bearing in mind natural conditions that may arise. Several questions come to mind concerning your proposed increased pool. We have asked Engineering to make some evaluations in view of the new elevation data that is now on file.

You may wish to compile some habitat data to support the 1433.26 elevation so all this can be covered in detail during your next supervisory inspection.

Photographs that have direct relationship to your water management operations should be a part of your annual program. They assist us in improving our understanding of your proposals, current conditions, and effects of previous management. Such photographs might include a wide range of pertinent subjects; marsh changes brought about by pool operations, pollution problems, repair or damage to dikes and controls, new structures and others.

For the sake of uniformity the annual report should be titled Annual Water Program. This will avoid confusing it with a water plan which is a long range comprehensive report.

Attachment

Jerald J. Wilson

JJWilson:se 2/24/66

UNITED STATES GOVERNMENT

Memorandum

LA-2

[Handwritten initials]

TO : Regional Supervisor,
Division of Wildlife Refuges

DATE: February 10, 1966

EH-R Lake Andes
Water Mgmt Plan

FROM : Regional Engineer

SUBJECT: Lake Andes NWR, South Dakota - 1966 Annual Water Management Plan

We have reviewed the subject plan and concur in the proposed plan of operation for 1966.

We have the following comments regarding "Table II - Impoundment Data - 1965" of the annual water management plan.

1) It appears that the estimate of evapo-transpiration for the North Unit is quite low, whereas the same figure for Owens Bay is unusually high. (Less than one foot on the North Unit and approximately five feet on the Owens Bay surface acreages)

2) We suggest that the refuge manager recheck the figures on inflow-outflow and evapo-transpiration for 1965 after first reviewing the "handout" tabulations that were passed out at the Regional Conference on this subject. We believe that the sample tabulation given out at the conference could be adopted quite well to the needs of the Lake Andes Refuge. (The tabular method referred to neglects transpiration, at least for computation purposes.)

*MANE copy
for inspection
JW
2/23/66*

We note the refuge manager's remarks concerning the proposed maximum levels for the Wagner Unit. To our knowledge the maximum level proposed by our Bureau for both the South and Center Units under this plan is still 1435. You may wish to comment further on this.

[Signature]
John D. Umberger



UNITED STATES GOVERNMENT

Memorandum

R

TO : Regional Director, Minneapolis, Minn.

DATE: January 11, 1966

FROM : Refuge Manager, Lake Andes Refuge,
Lake Andes, South Dakota

SUBJECT: Annual Water Management Plan

MADE COPY
for inspection
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Although I have not mentioned this in the plan itself, I feel that we should not continue to recommend the lower water levels in the South and Center Units of Lake Andes. Under the proposed plan for the Wagner Irrigation Unit, water levels of 1436.35 have been tentatively approved for the South Unit. Likewise, levels of 1435.00 have been approved for the Center Unit. These levels are 1.5 and .15 feet higher, respectively, than the levels recommended in the annual and long range water management plans. In order to maintain these levels, we would have to modify the water control structure on the south dike between these pools.

Biologically, I do not believe that a level of 1436.26 for both the South and Center Units would be too high. We would benefit by having additional shoreline for nesting in the Johnson and Bechen Bay areas. I have discussed the biological implications of this higher water level with Mr. Ralph Town, area biologist. He agrees that there should be no objection to an approved level of 1436.26 for both units.

In checking back into some of the past history on the Wagner Irrigation Unit, I find that Mr. Harvey Miller also recommended levels of "anywhere from 1436.00 to 1437.25" for the Center Unit (Miller's memorandum to the Regional Office dated August 29, 1963).

I have not included these comments or suggestions in the annual water management plan because a revision of the long range plan would have to be made. In addition, the Division of Engineering may have some objections to recommending the higher levels.

It might be best to discuss this problem sometime during the week that I am attending the Regional Conference.

David L. Olsen
David L. Olsen

LAKE ANDES NATIONAL WILDLIFE REFUGE
Lake Andes, South Dakota

Program
ANNUAL WATER MANAGEMENT PLAN - 1966

A. General Water Uses.

Lake Andes proper is divided into three separate units by two dikes. Control structures in these dikes and an emergency spillway located in the north dike are designed to hold water levels at desirable management levels.

Most of the watershed drains into either the South or North Units and their overflow fills the Center Unit. Water flows from the North Unit into the Center Unit at elevation 1436.26. When the elevation of the South Unit rises over 1434.85, water passes from the South Unit into the Center Unit.

Owens Bay is managed as a separate unit with its water supply dependent upon the flow of the artesian well. This is the only pool where water levels are truly manageable.

B. 1965 Water Uses.

1. North Unit.

Water levels in the North Unit rose 1.16 feet during the calendar year. This was due to a heavy rainfall experienced in an area approximately 12 miles north of the Refuge; it added 1,140 acre feet of water to the unit. Water rose high enough to flow through the spillway tubes into the Center Unit.

Approximately 325 acre feet were lost through a combination of evapo-transpiration and loss through the spillway.

While the number of breeding pairs of waterfowl observed was the same as the 5 year average, the number of broods counted was down considerably (see Table I).

In the open water areas, sago pondweed (Potamogeton pectinatus) was the dominant aquatic. Luxuriant stands of bullrush (Scripus sp.) were evident along the shorelines and across the northern part of the unit. These emergents provided excellent brood cover.

Lower water levels during January and February, combined with heavy snow over the ice, caused a fish kill. All species

except bullheads were affected.

2. Center Unit.

Water levels in the Center Unit have slowly dropped since April 13, 1963. The amount of inflow into this unit through the spillway from the North Unit was exceeded by the evapo-transpiration rate. Over 3,400 acre feet were lost during this year.

Little runoff was noted from the land adjacent to this unit.

The waterfowl breeding population dropped from the previous year and was down 64% from the 5 year average. The number of broods observed was less than the 5 year average but higher than the number observed during 1964 (see Table I).

Stands of sago pondweed were considered good throughout the unit, however, seed production was considered only fair. Clasping leaf pondweed (*P. richardsonii*) was noted in the Johnson Bay area. The floating aquatics prohibited outboard motor traffic and discouraged fishermen throughout most of the summer. Extensive use of the pondweeds was made by migrant mallards, gadwall, and diving ducks.

Using the Sincok method, an attempt was made to quantitatively measure the number of pounds of sago pondweed produced per acre. This method did not prove successful.

Bullheads, northern pike, and a few crappie remained after the heavy winterkill. It was estimated that the winterkill on large-mouth bass was 100%.

3. South Unit.

Like the Center Unit, water levels in the South Unit have steadily decreased since the spring of 1963. The discharge from Owens Bay and an average amount of runoff provided the indicated 500 acre feet of inflow.

Waterfowl breeding populations and the number of broods observed increased from the previous year. Neither were up to the 5 year average, however (see Table I).

This unit supported good stands of sago pondweed. Seed production of this species was only classed as fair, however. These thick stands of pondweeds, together with the lower lake levels and past winter's winterkill, discouraged fishing and boating in the South Unit.

4. Owens Bay.

In accordance with the Long Range Water Management Plan, higher water levels were maintained in Owens Bay during the winter months when the duck trapping operation was in progress. To make available more shoreline during the summer months, a 12 inch stop log was removed from the structure on March 30. It was replaced on September 28 in preparation for the post season mallard banding operation.

Breeding populations dropped but the number of broods observed was somewhat higher than those observed during 1964 (see Table I).

It was estimated in the Long Range Water Management Plan that, if the present trend continues, the water from the artesian well will stop flowing in approximately 14 years (1980). In an effort to more accurately detect changes in volume output of this well, a staff gauge was placed just above the 24 inch weir. Since the gauge was established, no detectable change in the output of the well has been noted.

The outlet pipe from the artesian well continues to deteriorate. An effort will be made to have this replaced during 1966. After the horizontal pipe is replaced, a check can be made of the condition of the uppermost 5 or 6 feet of the verticle casing to determine if corrosion is also taking place on that pipe.

The temperature of the artesian well flow remains at about 71 degrees. This factor aids in keeping a large portion of the unit open during the colder periods of the winter months.

A complete winterkill of the large mouth bass and bluegills in this unit was noted. We do not feel that the cause was oxygen depletion because a considerable portion of this pool remained open throughout the winter months.

C. Summary.

Rainfall for this area totaled over 21 inches for the calendar year 1965. Although this is considered average for the Lake Andes area, the water levels dropped in the Center and South Units. The rise in the water level of the North Unit was attributed to a heavy local rainfall experienced north of the Refuge.

Although the commercial fisherman has taken 481,200 pounds of bullheads during the past calendar year, the bullhead population seems to be holding its own. The large population of bullheads does not seem to be having an adverse affect on aquatic production.


D. Recommendations for Management During 1966.

In accordance with long range planning for the Owens Bay Unit, water levels should be retained at a higher level during the winter months to facilitate use of the Colorado ramp duck trap in the winter banding program. Likewise, levels should be lowered during the spring and summer to make more shoreline available as waterfowl breeding territories.

Unless an unusually large amount of snow falls or heavy spring rains are received, the water levels may continue on the downward trend.

The following levels are recommended for calendar year 1966:

<u>Unit</u>	<u>Present Gauge Reading</u>	<u>Recommended Level</u>	<u>Spillway Elevation</u>	<u>Expected Inflow</u>
North	1135.66	1136.26	1136.26	Watershed runoff
Center	1132.98	1134.85	1137.25	do
South	1133.22	1134.85	1137.25	do
Owens Bay	1140.48	1141.12	1141.52	750 gpm



David L. Olsen

January 11, 1965

TABLE I
BREEDING PAIR AND BROOD COUNTS - LAKE ANDES

	Owens Bay		North Unit		Center Unit		South Unit	
Year	Breeding Pairs	Broods	Breeding Pairs	Broods	Breeding Pairs	Broods	Breeding Pairs	Broods
1961	91	7	152	26	531	103	266	146
1962	80	15	115	12	306	50	131	21
1963	183	9	155	22	219	45	201	35
1964	148	5	119	1	289	19	57	9
1965	46	7	56	8	105	28	95	13
5 year Average	109	9	119	14	290	49	150	45

TABLE II
IMPOUNDMENT DATA - 1965

	North Unit			Center Unit		
	Gauge Reading	Surface Acres	Capacity Acre Feet	Gauge Reading	Surface Acres	Capacity Acre Feet
January	1134.50	483	1,175	1134.16	2120	10,800
February	1134.50	483	1,175	1134.16	2120	10,800
March	1134.50	483	1,175	1134.52	2123	11,700
April	1134.50	483	1,175	1134.52	2123	11,700
May	1134.39	476	1,125	1134.10	2119	10,600
June	1134.35	474	1,100	1133.90	2110	10,200
July	1135.48	533	1,685	1133.88	2100	10,180
August	1136.50	580	2,240	1133.78	2090	9,960
September	1136.00	558	1,970	1133.38	2070	9,000
October	1135.84	551	1,890	1133.21	2050	8,900
November	1135.66	542	1,790	1133.22	2050	8,900
December	1135.66	542	1,790	1132.98	2040	8,300
Inflow	1140 acre feet from watershed.			800 acre feet from watershed.		
Outflow	325 acre feet evapo-transpiration.			3400 acre feet evapo-transpiration.		
	South Unit			Owens Bay Unit		
	Gauge Reading	Surface Acres	Capacity Acre Feet	Gauge Reading	Surface Acres	Capacity Acre Feet
January	1134.00	1650	9,500	1140.44	215	385
February	1134.00	1650	9,500	1140.44	215	385
March	1134.00	1650	9,500	1141.12	233	540
April	1134.18	1660	9,700	1140.80	225	465
May	1134.30	1668	10,000	1140.18	207	330
June	1134.26	1665	9,900	1140.26	210	348
July	1134.24	1663	9,850	1140.24	209	345
August	1134.00	1650	9,500	1140.12	205	320
September	1133.58	1647	8,800	1139.90	198	280
October	1133.40	1640	8,400	1140.10	204	313
November	1133.30	1630	8,200	1140.26	210	348
December	1133.22	1628	8,060	1140.48	216	390
Inflow	500 acre feet from watershed.			750 gal. per minute, or 1279 acre feet.		
Outflow	1940 acre feet evapo-transpiration.			278 acre feet discharged into South Unit and 1001 acre feet evapo-transpiration.		

OWENS BAY
LAKE ANDES NATIONAL WILDLIFE REFUGE

Newly established
water gauge

ARTESIAN
WELL

